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GALINSOGA CILIATA (COMPOSITAE): ITS ARRIVAL AND SPREAD IN THE NORTHEASTERN UNITED STATES

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A common weed in the family Compositae, *Galinsoga ciliata* (Raf.) Blake, is a ruderal on both the North American and European continents, probably arriving from South America. The time of its arrival and the rate of its subsequent spread to New England can be estimated with reasonable accuracy from notes in the literature and from information on herbarium sheets. Knowledge of the arrival time of a species into a particular area can be useful in determining evolutionary rates of ecological races (Shontz, 1969).

The history of the species cannot be traced before 1836 when de Candolle separated *Galinsoga parviflora* into two varieties. His *G. parviflora* var. *hispida* is the present-day *G. ciliata*. Also in 1836 Rafinesque described a new genus and species, *Adventina ciliata*, from specimens he found growing in the Bartram Garden of Philadelphia (Blake, 1922). This description is the first record of *G. ciliata* in the United States, but Rafinesque's work was overlooked until 1922. Bicknell (1916), after examining collections from Nantucket Island, Mass., raised *G. parviflora* var. *hispida* to specific rank and renamed the taxon *G. aristu-*

lata. St. John and White (1920) in a review of the genus upheld Bicknell's interpretation. Two years later, Blake (1922) rediscovered Rafinesque's publication and placed Bicknell's *G. aristulata* in synonymy with *G. ciliata*. This treatment is followed in manuals of botany (Fernald, 1950; Gleason, 1952). After studying Mexican and Guatemalan specimens, Turner, Powell and King (1962) concluded that the identifying characteristics which separate *G. ciliata* from *G. parviflora* in the United States and the British Isles might be marked enough to distinguish species in places where the plants have been introduced. In Mexico, however, the differences within the *G. ciliata-parviflora* complex appear to be variations within a single population, and the degree of variation does not exceed that of many widespread weeds.

The species *Galinsoga ciliata* is in the Family Compositae, Tribe Heliantheae, Subtribe Galinsoginae. Plants of *G. ciliata* are usually found growing on patches of bare soil where the ground is frequently disturbed. They are not part of the normal old field succession which occurs if the previously disturbed area is protected from further disruption, since they rarely can compete with taller successional plants which require more than one growing season to become established. Herbarium sheets record its presence at dumps, roadsides, brooksides, sidewalk borders, railway banks, gardens, barnyards, dikes, empty lots, and neglected fields. It often grows in company with species of plantain *(Plantago)*, sorrel *(Oxalis)*, clover *(Trifolium)* and various grasses. Although a relatively recent arrival, *G. ciliata* has acquired at least three common names: Argentine daisy, frenchweed and devilsweed.

Galinsoga ciliata is generally considered to be naturalized from tropical America. Specimens in the Gray Herbarium (Harvard University) were collected in Guatemala (1860), Costa Rica (1891), Mexico (1908), Argentina (1938), Peru (1925) and Chile (1931); the type specimen was collected in Chile in 1790 (photograph examined in Gray Herbarium). After Rafinesque's description of *G. ciliata*, it was

not recorded in New England until 1866 when it was reported from Gilmanton, N.H. (St. John and White, 1920). Another collection in New Hampshire was made at a dumping ground at Milford in 1898 (Wheeler, GH). The plant had extended its range into Maine by 1899 when it was reported in Farmington (Knowlton, GH). In 1902 at Andover, Maine, Rand (1903) reported that it was becoming abundant in gardens, and in 1903 he found it in abandoned gardens at Mount Desert. He felt these two observations indicated a further extension of range by the species. At this time *G. ciliata* was locally abundant, but apparently not widespread or commonly recognized. Knight (1904) collected some from an area in Maine where the straw for packing crockery was commonly dumped and, being unable to identify it, took it to Fernald at the Gray Herbarium for identification. Knight suggested that the plant was introduced in the waste materials; however, previous reports located the plant near the area, so it is more likely the seeds were blown to bare ground in the dumping site. It was collected in Longueuil, Quebec, in 1916 (Fr. M.-Victorin, NY); by 1935 it was living in ten out of twelve streets sampled in Montreal, Quebec (Cléonique-Joseph, 1936), and by 1941 was a common sight in the streets of Halifax, Nova Scotia (Roland, 1941).

To the south it had reached Staten Island by 1873 (Woolson, SCHN) and was collected on Manhattan Island in 1887 (Sterns, GH). It was found in the streets of New Haven in 1886 (Harger, NEBC) and had spread north to Southington, Conn., by 1898 (Andrews, NEBC) where it was collected on cultivated ground. Apparently a recent arrival to waste ground in Providence, R.I. in 1892 (Bailey and Collins, GH), it was collected then but was not mentioned in the state catalog of plants in 1888 (Collins, 1899). Britton and Brown list Rhode Island as the northern extent of this species in 1896. The herbarium sheets of the New England Botanical Club, however, record the collection of *G. ciliata* in 1891 (Fernald) in Cambridge, Mass.; this was followed by several collections from Weston, Boston and Jamaica Plain. The Cambridge specimens appear to

be among the earliest in Massachusetts, although earlier references to *G. parviflora* in the literature may actually refer to *G. ciliata*, as the distinction was often not made at this time between varieties of *G. parviflora*. By 1900 *G. ciliata* was rated as being "more commonly found" by a botanist in Dedham, Mass. (Rich, 1900). In western Massachusetts it was reported from Stockbridge in 1899 (Hoffmann, NEBC) and from Amherst in 1914 (#28614, MASS). South of New York, a plant of *G. ciliata*, the oldest specimen of this species in thc New York Botanical Garden herbarium, was collected in Baltimore, Md., in 1861 (Canby). Other collections were made at Allegheny City, Pa., in 1869 (Porter, GH), Germantown, Pa., in 1880 (#2577, NY), Camden, N.J., in 1881 (#40600, MASS), Wilmington, Del., in 1881 (Commons, GH), Philadelphia (Greenman, GH) and Berwick, Pa., (Heller, GH) in 1889.

The manner of the introduction of *G. ciliata* into the United States is not definitely known. Except for the report from Gilmanton, N.H. (St. John and White, 1920), the oldest records mentioned above are herbarium specimens from Baltimore, eastern Pennsylvania and New York. This fact, combined with Rafinesque's early description from the Bartram Garden, lends credence to the idea that the weed was introduced from South America to this location in Philadelphia and spread from there. The possibility also exists that *G. ciliata* came to Philadelphia from South America by way of the Kew Gardens. Ruiz and Pavon sent materials from Peru to Kew, and there was also exchange of plants between Kew and the Bartram Garden at this time (L. I. Nevling, Jr., personal communication). Only Gleason and Cronquist (1964) suggest that the plant was introduced along the Gulf Coast between 100 and 150 years ago, as well as at "other times and places", without presenting evidence.

If the herbarium dates may be taken as an indication, *G. ciliata* probably arrived in western Massachusetts close to the end of the nineteenth century and has maintained itself on bare soil in gardens, barnyards and roadsides. While the manner of its arrival is somewhat in doubt, two possibilities present themselves: transport of seeds and

plants to greenhouses and dumps by the agency of man or gradual extension of range by the plant through natural seed dispersal from some original point of entry. Since *G. ciliata* is a weed in greenhouses and nurseries where it grows under benches and in pots with more desirable plants, it may have been introduced into one or more greenhouses with plants imported from South or Central America or from the Bartram Garden, and have escaped outside in discarded soil. Several collectors have noted its presence in dumps and theorized that it spread from place to place in discarded materials. Certainly the presence of bare ground in dumps encourages the germination of *Galinsoga* seeds, no matter how they arrived. The concentration of collections made around large cities might attest to the human influence in its spread — as man's moving of packing materials or greenhouse stock from city to city — or to the concentration of professional and amateur botanists in the centers of population. The latter seems less likely, since Blake (Ridley, 1930) observed that both *G. ciliata* and *G. parviflora* were at one time growing almost entirely in the vicinity of cities in the eastern United States but were of very rare occurrence in the country towns. Blake also found a similar distribution pattern in England. Range extension over unbroken areas, the other possibility, would have required rapid migration to western Massachusetts from New Hampshire, Connecticut or eastern Massachusetts. Cléonique-Joseph (1936) suggested wind as the primary means of transport. The small hispid seeds may also be caught in hair and feathers of passing animals and be carried to new sites favorable for growth. As *G. ciliata* extended its range, the plants may even have invaded greenhouses through open vents and doors, and have been brought in with unsterilized soil.

The observations of Blake on the concentration of this species around cities support the hypothesis of spread by man's agency rather than movement by other means, since the latter would be marked by the occurrence of *G. ciliata* in the intervening countryside. In England Salisbury (1961) determined that *G. parviflora* spread at a steady

rate, depending on local air currents to aid its movement and to determine the direction of its dispersal. Long-distance dispersal he attributed to transport on human clothing and in garden soil, rather than to the prevailing wind. All these observations suggest that a combination of human and environmental factors contributed to the arrival and rapid establishment of *G. ciliata* in the northeastern United States.

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ASTER PARVICEPS (BURGESS) MACK. & BUSH AND ASTER BRACHYACTIS BLAKE, NEW FOR KANSAS

While preparing a treatment of the genus *Aster* (Compositae) for Kansas, specimens of two species were examined which have not been previously reported for the state. The range of *Aster parviceps* (Burgess) Mack. & Bush is thus extended west from Missouri and of *Aster brachyactis* Blake, east from Colorado. *Aster vimineus* Lam. is excluded from the flora since previous reports were based on misdeterminations of *Aster pilosus* Willd., *A. simplex* Willd., and *A. parviceps* (Burgess) Mack. & Bush.

Representative specimens of the two species are:

Aster brachyactis Blake. Finney Co.: sandy bank of Arkansas River, 1 mi s Holcomb, 11 Oct. 1968, *Stephens* 29676 (KANU). Morton Co: grasslands by Cimmaron River, 7 mi n, 1/2 e Elkhart, 6 Oct. 1962, *Wilson* 5523 (KSTC).

Aster parviceps (Burgess) Mack. & Bush. Douglas Co.: prairie over sandstone, 1 1/4 mi e, 1 s Baldwin, 14 Oct. 1967, *Johnson* 1187 (KANU). Labette Co.: prairie fence row, 5 mi w Mound Valley, 28 Sept. 1968, *Stephens* 29617 (KANU). Also from: Allen, Anderson, Bourbon, Chase, Coffey, Elk, Greenwood, Linn, Neosho, and Wilson Counties.

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